TITLE:

Urinary tract infection and blood P1 antigen: preliminary report

AUTHOR(S):

Yasumoto, Ryoji; Kakinoki, Kosuke; Yoshimoto, Mitsuru; Umeda, Masaru; Maekawa, Masanobu; Kuroki, Tetsuo

CITATION:

Yasumoto, Ryoji ...[et al]. Urinary tract infection and blood P1 antigen: preliminary report. 泌尿器科紀要 1984, 30(1): 9-11

ISSUE DATE:

1984-01

URL:

http://hdl.handle.net/2433/118101

RIGHT:

京都大学学術情報リポジトリ
KURENAI 紅
Kyoto University Research Information Repository

Acta Urol. Jpn Vol. 30
No. 1. January 1984

URINARY TRACT INFECTION AND BLOOD P_1 ANTIGEN: PRELIMINARY REPORT

Ryoji YASUMOTO, Kosuke KAKINOKI, Mitsuru YOSHIMOTO,
Masaru UMEDA and Masanobu MAEKAWA
From the Department of Urology, Osaka City University Medical School

Tetsuo KUROKI
From the Division of Hematology, Osaka City University Medical School

A clinical study was made on the relationship between the blood type P_1 antigen and urinary tract infection (UTI).

The blood type P_1 antigen could be detected in 3 out of 11 healthy Japanese volunteers (27.2%), and in 54% of the UTI patients as a whole. Classified by the type of infection, it could be detected in 3 out of 4 patients with upper UTI (75%) and in 11 out of 22 patients with lower UTI (50%). These incidences were higher than that of healthy volunteers, the difference being statistically significant.

The relationship between the annual frequency of UTI and the positive detection of P_1 antigen was examined. The patients who had been exposed to UTI twice or more a year proved to have a higher detection rate (61%), than the other group of patients, the difference being statistically significant.

Two of the patients with *E. coli* detected as a clinical isolate proved to have the P_1 antigen.

Key words: Urinary tarct infection, Blood P_1 antigen

INTRODUCTION

Since the blood type P_1 antigen was detected by Landsteiner in 1927, this blood type has been known to have some connection with certain illnesses such as habitual abortion[1)] and parasitic infection[1)]. In recent years its connection with urinary tract infections (UTI) has also been suggested. We thus made a study on the relation of the blood type P_1 antigen with cases of UTI that we often encounter in our daily practice.

PATIENTS AND METHODS

The study involved 26 patients (4 males and 22 females) who visited the Urological Department of Osaka City University Hospital and its related hospitals. Five healthy male and 6 healthy female volunteers were also included in the study as a control group. (Table 1)

Table 1. Patients profile

		male	female
control group	(n=11)	5	6
UTI group	(n=26)	4	22
upper UTI	(n=4)	0	4
lower UTI	(n=22)	4	18

UTI: Urinary Tract Infection.

Anti-P_1 serum (Ortho) was used for detection of the blood type P_1 antigen, and P_1 antigen was judged as positive or negative on the basis of positive or negative hemagglutination of red blood cells (Fig. 1).

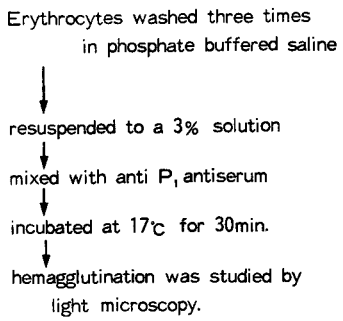

Fig. 1. Figure for method of determining blood P_1 antigen

RESULTS

1. The positive rate of P_1 antigen in healthy volunteers (Table 2)

P_1 antigen could be observed in 3 of the 11 volunteers (27.2%).

Table 2. The positive rate of blood P_1 antigen in healthy volunteers and the group of UTI

	Blood P substance			
	positive (+)	negative (−)		
Control group (n=11)	3	8	*	
UTI group (n=26)	14	12		*
upper UTI	3	1	ns	
lower UTI	11	11		*

UTI : Urinary Tract Infection
* : $p<0.01$
ns : no significance

2. The positive rate of P_1 antigen in the group of UTI

Table 2 shows the positive rate of P_1 antigen in the 26 patients belonging to the group of UTI. As a whole, it was positive in 54%. If classified by the type of infection, it was positive in 3 out of 4 patients with upper UTI (75%) and in 11 out of 22 patients with lower UTI (50%), and the incidences were significantly higher than that in healthy volunteers ($P<0.01$).

3. The annual frequency of UTI and the positive rate of P_1 antigen (Table 3).

The relationship between the annual frequency of UTI and the positive rate was next examined. The positive rate of P_1 antigen was significantly higher in patients who had suffered from UTI twice or more a year than the other patients ($P<0.05$).

Table 3. The annual frequency of UTI and the positive rate of blood P_1 antigen

	Blood P substance		
	positive (+)	negative (−)	
UTI group times/year			
initial (n=8)	2	6	ns
2 (n=12)	8	4	*
2 ~ (n=6)	3	3	ns
Control group (n=11)	3	8	

* : vs Control, $P<0.001$
ns : no significance

4. The clinical isolates of bacteria and the positive rate of P_1 antigen (Table 4).

The clinical isolates that could be identified were five kinds. The most common pathogen was *E. coli* which was isolated in 7 patients, followed by Proteus, Klebsiella, Serratia and Pseudomonas which were detected in 1 patient each. Among these patients, P_1 antigen was found positive in only 2 of the patients with *E. coli*.

Table 4. The clinical isolates of bacteria and the positive rate of blood P_1 antigen

	Percentage of Blood Psubstance of isolated bacteria	
	YASUMOTO ('83)	Roland ('81)
E.coli	2/7 (28.5)	(25)
Proteus	0/1 (0.0)	(42.8)
Klebsiella	0/1 (0.0)	(44.1)
Enterobacter	—	(46.6)
Serratia	0/1 (0.0)	
Pseudomonas	0/1 (0.0)	

DISCUSSION

As mentioned above, the blood type P_1 antigen is supposed to be connected with various illnesses. Its relation with urinary

tract infections, among others, was first described by Lomberg[2] in 1981, and later similar results were reported by Roland[3]. The results of our study seem to support Lomberg's view that people having the blood type P_1 antigen are more vulnerable to urinary tract infections.

On the other hand, there is no definite theory yet about where bacteria begins to adhere to epithelial cells of the urinary tract as the first step in inducing a urinary tract infection. Roland, who noticed the similarity between the glycolipid composition and the blood type P_1 antigen on the bacterial surface, hypothesized that adhesion of bacteria might begin in that structure.

REFERENCES

1) Naiki M: Recent advance in human blood group P system. Biochemistry **51** 1240～1248, 1979
2) Lomberg H, Jodal U, Eden CS, Leffler H and Samuelsson B: P_1 blood group and urinary tract infection. Lancet **i**: 551～552, 1981
3) Roland FP: P_1 blood group and urinary tract infection. Lancet **i**: 946, 1981

(Accepted for publication, July 1, 1983)

和文抄録

尿路感染症と血液型 P_1 抗原
—予　報—

大阪市立大学医学部泌尿器科学教室（主任：前川正信教授）
安本亮二
柿本宏介
吉本充
梅田優
前川正信

大阪市立大学医学部輸血部
黒木哲男

血液型 P_1 抗原と尿路感染症（UTI）との関係を調べた．対象は正常人11例，UTI 26例で，後者の内訳は上部尿路感染症 4 例，下部尿路感染症22例であった．P_1 抗原の検出方法は Lomberg（1981）の方法に従った．＜結果＞①正常人における P_1 抗原検出率は3/11例（27.2%）であるのに対し，UTI 群では14/26例（54.0%）と高い値を示し推計学的にも有意であった．②過去 1 年間に UTI を来たした回数についての検討では，2 回以上 UTI を来たした症例に高い P 抗原検出率を認めた．③臨床分離菌についてみると，*E. coli* を認めた 7 例中 2 例に P 抗原を検出したが，Proteus, Klebsiella, Serratia, Preudomonas を認めた症例はいずれも検出しえなかった．